Subject: Surgical Treatment of Migraine Headache

Background: Surgical deactivation of migraine trigger sites is intended to treat individuals with refractory migraine headache disorder that cannot be managed by conventional treatments or for those who are intolerant of the side effects of such conventional treatments. The procedure involves the resection of one or more muscle groups that may be compressing specific nerves. Although there have been a small number of studies with positive outcomes, substantial uncertainties remain around the safety and impact on health.

Policy and Coverage Criteria:
Harvard Pilgrim Health Care (HPHC) considers surgical treatment of migraine headache as experimental/investigational, and it is therefore not covered.

Supporting Information:
Surgical treatments for migraine headaches have been developed as a potential means to obtain long-term or permanent headache prevention. This approach was investigated initially as an unanticipated benefit of cosmetic surgery. It has been postulated that activation of peripheral sensory nerves, including the trigeminal nerve causes release of peptides, (e.g., substance P, calcitonin gene-related peptide, neuropeptides), resulting in vasodilatation and migraine headache. Also, that trigger points can be identified, particularly in the region of the forehead, at which peripheral nerve activation occurs. Botox has been used in some migraine patients. Injection of various craniofacial muscles can provide temporary relief in certain patients. Researchers have proposed using Botox injection as a screening test for peripheral nerve irritation caused by muscle compression as a cause of migraine. Those who respond to the Botox injections may benefit from surgical decompression of craniofacial peripheral nerves. Further, intranasal contact points between mucosal surfaces of the nasal septum and turbinates are suggested to act as triggers releasing pain mediators that are also present in the trigeminovascular system contributing to migraine headaches. Closure of patent foramen ovale (PFO) has also been explored as surgical treatment to improve or eliminate migraine. The pathophysiological mechanism is speculated to be passage of microemboli and vasoactive chemicals through the PFO, thereby evading pulmonary filtration and triggering migraine symptoms.

Evidence to support the surgical treatment of migraine continues to evolve. A number of surgical treatment approaches have been proposed with some reported success. However, stronger studies with adequate follow-up are needed to confirm results and better establish appropriate patient selection.

A 2018 UpToDate article reported results from a single-center, blinded, randomized controlled trial that suggested surgical removal of muscle or nerve tissue from headache “trigger sites” may be effective treatment for individuals with frequent migraine headaches. However, the trial results have been received with skepticism by some experts due to methodologic flaws, including poor care definition. Given the flaws in study design, it was determined that independent confirmation of benefit in more rigorous trials was needed.
Lee et al. (2017) performed a retrospective review on individuals with rhinogenic migraine headaches. 20% of the 98 patients had preoperative sinus disease, 89% of the patients had septoplasty procedures, and 60% of the individuals had conservative turbinectomies. The authors concluded the lack of successful outcomes pertained to the consequence of conservative nasal management and residual contact points. Overall, the migraine surgery population did not show favorable results.

Mattle et al. (2016) presented the Percutaneous Closure of patent foramen ovale (PFO) in Migraine with Aura (PRIMA) trial through a randomized clinical trial. 107 patients were randomly assigned to be treated with an Amplatzer PFO Occluder (N=53) or control with medical management (N=54). The migraine with aura patients and PFO who were unresponsive to preventive medications were randomized to PFO closure or medical treatment. Patients after PFO closure had a 1.2 days greater reduction in migraine days per month than the individuals within the control group. However, the difference was not statistically significant and PFO closure did not reduce overall monthly migraine days for individuals with refractory migraine with aura and PFO.

Ducic et al. (2014) conducted a retrospective chart review and supplemental survey of 71 patients who had undergone greater occipital nerve (GON) excision after failing occipital nerve decompression. The migraine headache index (MHI) was used to measure headache severity and the migraine disability assessment to assess disability. A reduction in MHI of greater than 50% at final follow-up (average 33 months) was considered a success. The success rate of surgery was 70.4%; 41% of patients showed a 90% or greater decrease in MHI. There was a significant improvement in MHI scores (146 to 49) resulting in an average reduction of 63%. There was a significant decrease in migraine disability assessment scores (49%). The authors concluded that excision of the GON is a valid option for pain relief in patients with occipital headaches refractory to both medical treatment and surgical decompression.

Liu et al. (2012) published results of a retrospective study comparing results of patients who underwent transpalpebral versus endoscopic approach to decompression of the supraorbital and supratrochlear nerves for treatment of frontal migraine. Charts for 253 patients were reviewed. 62 underwent transpalpebral nerve decompression and 191 underwent endoscopic decompression. The authors found the endoscopic approach had a significantly higher success rate than the transpalpebral nerve decompression. The elimination of migraine was significantly higher in the endoscopic nerve decompression group.

A 2012 study (Chepla et al.) examined the outcomes of additional decompression methods by comparing results of patients who underwent glabellar myectomy alone and patients who also underwent supraorbital foraminotomy. Outcomes measures included migraine frequency, severity, and duration. The myectomy group statistically matched the myectomy with foraminotomy group for age, number of surgical sites, and preoperative headache characteristics. Results found significantly lower scores for the group with myectomy with foraminotomy. Chepla et al. concluded the supraorbital foramen is a potential site of suborbital nerve compression that can trigger frontal migraine. If present, the authors recommend foraminotomy to ensure complete release of supraorbital nerve to optimize outcomes.

Rigatelli et al. (2010) reported on results of a study evaluating the effectiveness of PFO transcatheter closure in migraine patients with anatomical and functional characteristics predisposing to paradoxical embolism without previous cerebral ischemia. Based on basal shunt and shower/curtain shunt pattern on transcranial Doppler and echocardiography, presence of interatrial septal aneurysm and Eustachian valve, 3 to 4 class MIDAS score, coagulation abnormalities, and medication-refractory migraine with or without aura, 40 patients underwent the PFO closure. After a mean follow up of 29.2 months (+/- 14.8 months), PFO closure was complete in 95% of patients. All reported improved migraine symptomatology. Auras were eliminated in 100% of patients at final follow up. These results led the researchers to conclude primary transcatheter PFO closure resulted in a
significant reduction in migraine in patients satisfying the inclusion criteria. Trabattoni et al. (2011) published results of a single-center, observational, prospective study evaluating the impact of PFO closure on migraine attacks over time. Between May 2000 and September 2009, 305 consecutive patients (mean age, 43 ± 12 years; 54.5% women) with a prior embolic cerebrovascular event underwent PFO closure with the Amplatzer PFO occluder for recurrence prevention. All patients had right-to-left shunts; the shunts were associated with migraine symptoms in 77 (25%), either alone (n = 64, 83%) or with aura (n = 13, 17%). Septal aneurysm was present in 15 (19.5%) migraine patients, and 43 (56%) had a previous transient brain ischemic attack. All migraine patients had a CT or MRI, indicating a previous brain ischemic lesion. All 305 patients underwent transthoracic echocardiography with clinical follow-up at 24 hours, at 3, 6, and 12 months, and then yearly. There was a significant reduction in the number and intensity of migraine attacks in 46 of the 77 pants at 3-months follow-up. At 12 months, migraine had ceased in 23 of the 77 and 20 had a reduction in the migraine recurrence rate and disabling symptoms. There was overall improvement in migraine in 89% of the treated patients. Trabattoni et al. concluded PFO closure may provide beneficial mid-term and long-term results with significant reduction in the intensity and frequency of migraine symptoms.

Another study by Guyuron et al. (2009) investigated surgical treatment of migraine. The researchers conducted a single-center blinded randomized controlled trial on 76 patients with headache trigger sites identified by positive response to Botox injection. At 12 months, results found 15 of the 26 in the sham group and 41 of 49 in the surgery group experienced at least 50% reduction in migraine headache. (p<.05). 28 of the 49 patients in the treatment group reported complete elimination of migraine, compared with 1 out of 26 in the sham group. The surgery group demonstrated significant improvement in all validated migraine headache measurements at 1 year. The improvements were not dependent on the trigger site. Guyuron et al. concluded the study confirmed that surgical deactivation of peripheral migraine headache trigger sites is an effective alternative treatment for those who suffer from frequent moderate to severe migraine headaches difficult to manage with standard treatments. A review of evidence, specifically the MIST trial, by Koppen et al. (2009) found there may be an epidemiological association between PFO and migraine with aura, but the causal relationship remains uncertain. The authors cautioned, "the initial positive reports about the MIST study were premature, as ultimately the MIST trial did not show any significant difference between PFO closure and sham closure on migraine. Given these results, earlier retrospective, uncontrolled studies on PFO closure for migraine prophylaxis should be interpreted with great caution. At present PFO closure is not an option for migraine prophylaxis. More randomized studies may be useful, although the side effects of PFO closure might not outweigh the benefits."

Dowson et al. (2008) discussed results of randomized, double-blind, sham-controlled trial of PFO closure for migraine. The treatment group underwent transcatheter PFO closure with the STARFlex implant. Primary efficacy end point was cessation of migraine 61 to 180 days after the procedure. In total, 163 of 432 patients (38%) had right-to-left shunts consistent with a moderate or large PFO. One hundred forty-seven patients were randomized. No significant difference was observed in the primary end point of migraine headache cessation between implant and sham groups (3 of 74 versus 3 of 73, respectively; p=0.51). Secondary end points also were not achieved. On exploratory analysis, excluding 2 outliers, the implant group demonstrated a greater reduction in total migraine headache days (p=0.027). As expected, the implant arm experienced more procedural serious adverse events. All events were transient. Dowson et al. determined the trial confirmed the high prevalence of right-to-left shunts in patients with migraine with aura. While no significant effect was found for primary or secondary end points, further investigation is warranted.

In 2003 Welge-Luessen et al. published results of a 10-year longitudinal study of endonasal surgery for contact point headache. The study included 20 patients with a mean 18-year history of refractory cluster or migraine headaches who were selected for surgery. All had endoscopically visible endonasal contact as well as a positive preoperative cocaine test result. Changes in pain severity and frequency and duration of headache attacks were

**HPHC Clinical Medical Policy**

**Surgical Treatment of Migraine Headache**

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statistically rated using a MANOVA. Follow-up averaged 112 months. Almost 10 years after surgery, six patients remained completely free of pain, seven had significant symptom improvement, and seven received no benefit from surgery (65% improvement). Two patients had been free of all symptoms for 7 and 8 years, respectively, before complaints returned. The researchers felt the data suggested some patients with refractory headaches and endonasal contact benefit from surgery. They acknowledged surgery should only be considered after all other treatments have failed and preoperative patient selection remains crucial and warrants further investigation.

**Guidelines:**
The American Headache Society (AHS, 2012) advises providers to exercise caution when recommending any surgical intervention for migraine treatment. The society concluded there hasn't been any convincing or definitive data to show long-term value and the procedure lacked appropriateness.

**Coding:**
Codes are listed below for informational purposes only, and do not guarantee member coverage or provider reimbursement. The list may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible.

<table>
<thead>
<tr>
<th>CPT® Codes</th>
<th>Description</th>
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<tbody>
<tr>
<td>15824</td>
<td>Rhytidectomy; forehead</td>
</tr>
<tr>
<td>15826</td>
<td>Rhytidectomy; glabellar frown lines</td>
</tr>
<tr>
<td>30130</td>
<td>Excision inferior turbinate, partial or complete, any method</td>
</tr>
<tr>
<td>30140</td>
<td>Submucous resection inferior turbinate, partial or complete, any method</td>
</tr>
<tr>
<td>30520</td>
<td>Septoplasty or submucous resection, with or without cartilage scoring, contouring or replacement with graft</td>
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<td>31200</td>
<td>Ethmoidectomy; intranasal, anterior</td>
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<td>31201</td>
<td>Ethmoidectomy; intranasal, total</td>
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<tr>
<td>31205</td>
<td>Ethmoidectomy, extranasal, total</td>
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<tr>
<td>31254</td>
<td>Nasal/sinus endoscopy, surgical; with ethmoidectomy, partial (anterior)</td>
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<tr>
<td>31255</td>
<td>Nasal/sinus endoscopy, surgical; with ethmoidectomy, total (anterior and posterior)</td>
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<td>64732</td>
<td>Transection or avulsion of; supraorbital nerve</td>
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<tr>
<td>64734</td>
<td>Transection or avulsion of; infraorbital nerve</td>
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<tr>
<td>67900</td>
<td>Repair of brow ptosis (supraciliary, mid-forehead or coronal approach)</td>
</tr>
<tr>
<td>93580</td>
<td>Percutaneous transcatheter closure of congenital interatrial communication (ie, Fontan fenestration, atrial septal defect) with implant</td>
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**List of not medically necessary ICD-10 codes**

**Billing Guidelines:**
Member's medical records must document that services are medically necessary for the care provided. Harvard Pilgrim Health Care maintains the right to audit the services provided to our members, regardless of the participation status of the provider. All documentation must be available to HPHC upon request. Failure to produce the requested information may result in denial or retraction of payment.

**References:**

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Summary of Changes

<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>5/18</td>
<td>Background and supporting information updated; policy coverage criteria remains the same</td>
</tr>
<tr>
<td>1/18</td>
<td>Coding update</td>
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Approved by Medical Policy Review Committee: 5/29/18
Reviewed/Revised: 7/13; 7/15; 1/18; 5/18
Initiated: 7/13